

WHAT IS CLAIMED IS:

1. An optical filter module comprising:

5 an optical filter which selectively transmits, attenuates or reflects a light having a specific wavelength;

a first optical system which includes at least a first optical fiber to guide the light supplied to the optical filter, and a first lens to connect optically the first optical fiber with the optical filter, and

10 a second optical system which is oppositely provided to the first optical system through the optical filter, said second optical system including at least a second optical fiber to guide the light supplied from the optical filter, and a second lens to connect optically the optical filter with the second optical fiber, wherein

15 a lens surface of any one of end surfaces of the first optical system and the second optical system and a filter surface of an end surface of the optical filter, each including an optical path thereof, are bonded by adhesive agent coated on a portion apart from the optical path, further wherein

20 said at least any one of said lens surface and said filter surface, being opposed each other, has a groove portion which enables the adhesive agent penetrated through the bonded surfaces to stay therein, said groove portion being formed in such a way that penetration of the adhesive agent into the optical path can be blocked.

25 2. An optical filter module comprising:

an optical filter which selectively transmits, attenuates or reflects a light having a specific wavelength;

a first optical system which includes at least a first optical fiber to guide

the light supplied to the optical filter, and a first lens to connect optically the first optical fiber with the optical filter, and

a second optical system which is oppositely provided to the first optical system through the optical filter, said second optical system including at least a second optical fiber to guide the light supplied from the optical filter, and a second lens to connect optically the optical filter with the second optical fiber, wherein

any one of end surfaces of the first optical system and the second optical system is comprised of a convex surface including a optical path and a flat portion protruding from a peripheral portion of the convex surface to an outside of the optical path direction, said flat portion being formed so as to protrude outwardly from the convex surface of which portion is a most distant from said peripheral portion, further wherein

said any one of end surfaces and an end surface of the optical filter are bonded by adhesive agent coated on said flat portion.

3. An optical demultiplexer comprising:

an optical filter which selectively transmits only a light having a specific wavelength and reflect a light having other wavelength;

a first optical system which includes a first optical fiber to guide the light supplied to the optical filter and a second optical fiber to guide the light supplied from the optical filter, and a first lens to connect optically the first and second optical fibers with the optical filter, and

a second optical system which is oppositely provided to the first optical system through the optical filter, said second optical system including at least a third optical fiber to guide the light supplied from the optical filter, and a second lens to connect optically the optical filter with the second optical fiber, wherein

a lens surface of the first optical system and a filter surface of an end surface of the optical filter, each including an optical path thereof, are bonded by adhesive agent coated on a portion apart from the optical path, further wherein

5        said lens surface and said filter surface, being opposed each other, has a groove portion which enables the adhesive agent penetrated through the bonded surfaces to stay therein, said groove portion being formed in such a way that penetration of the adhesive agent into the optical path can be blocked.

10        4. An optical multiplexer comprising:

an optical filter which selectively transmits only a light having a specific wavelength and reflect a light having other wavelength;

15        a first optical system which includes at least a first optical fiber to guide the light supplied to the optical filter and a second optical fiber to guide the light supplied from the optical filter, and a first lens to connect optically the first and second optical fibers with the optical filter, and

20        a second optical system which is oppositely provided to the first optical system through the optical filter, said second optical system including at least a third optical fiber to guide the light supplied to the optical filter, and a second lens to connect optically the optical filter with the second optical fiber, wherein

a lens surface of the first optical system and a filter surface of an end surface of the optical filter, each including an optical path thereof, are bonded by adhesive agent coated on a portion apart from the optical path, further wherein

25        said lens surface and said filter surface, being opposed each other, has a groove portion which enables the adhesive agent penetrated through the bonded surfaces to stay therein, said groove portion being formed in such a way that penetration of the adhesive agent into the optical path can be blocked.

5. An optical demultiplexer comprising:

an optical filter which selectively transmits only a light having a specific wavelength and reflect a light having other wavelength;

5        a first optical system which includes at least a first optical fiber to guide the light supplied to the optical filter and a second optical fiber to guide the light supplied from the optical filter, and a first lens to connect optically the first and second optical fibers with the optical filter, and

10        a second optical system which is oppositely provided to the first optical system through the optical filter, said second optical system including at least a third optical fiber to guide the light supplied from the optical filter, and a second lens to connect optically the optical filter with the second optical fiber, wherein

15        an end surface of the first optical system is comprised of a convex surface including a optical path and a flat portion protruding from a peripheral portion of the convex surface to an outside of the optical path direction, said flat portion being formed so as to protrude outwardly from the convex surface of which portion is a most distant from said peripheral portion, further wherein

20        said end surface and an end surface of the optical filter are bonded by adhesive agent coated on said flat portion.

6. An optical multiplexer comprising:

an optical filter which selectively transmits only a light having a specific wavelength and reflect a light having other wavelength;

25        a first optical system which includes at least a first optical fiber to guide the light supplied to the optical filter and a second optical fiber to guide the light supplied from the optical filter, and a first lens to connect optically the first optical fiber with the optical filter, and

a second optical system which is oppositely provided to the first optical system through the optical filter, said second optical system including at least a third optical fiber to guide the light supplied to the optical filter, and a second lens to connect optically the optical filter with the second optical fiber, wherein

5 an end surface of the first optical system is comprised of a convex surface including an optical path and a flat portion protruding from a peripheral portion of the convex surface to an outside of the optical path direction, said flat portion being formed so as to protrude outwardly from the convex surface of which portion is a most distant from said peripheral portion, further wherein

10 said end surface and an end surface of the optical filter are bonded by adhesive agent coated on said flat portion.

7. An optical demultiplexer according to claims 3 or 5, wherein

15 said optical demultiplexer is used for an optical signal separation apparatus comprising a plurality of the optical demultiplexers, having wavelength band-pass filters of which wavelength bands to transmit are different from one another, further wherein

20 an optical fiber to guide a light supplied from a wavelength band-pass filter of an optical demultiplexer is connected to another optical fiber to supply the light to another wavelength band-pass filter of another optical demultiplexer so that the light having a plurality of wavelength bands is separated into a plurality of optical signals, each corresponding to a wavelength band of a wavelength band-pass filter respective thereof.

25 8. An optical multiplexer according to claims 4 or 6, wherein

said optical multiplexer is used for an optical signal coupling apparatus which is provided with a plurality of optical multiplexers, having a wavelength band-pass filters of which wavelength bands for the light to transmit are

